

AMENDMENTS TO THE CLAIMS

1. (Original) A method for producing a genetically modified organism of the *Blakeslea* genus, which method comprises the following steps
 - (i) transformation of at least one of the cells,
 - (ii) optional homokaryotic conversion of the cells obtained in step (i) to produce cells in which one or more genetic characteristics of the nuclei are all modified in an identical manner and said genetic modification manifests itself in the cells, and
 - (iii) selection and cultivation of the genetically modified cell or cells.
2. (Original) The method according to claim 1, wherein the cells are from fungi of the *Blakeslea trispora* species.
3. (Currently amended) The method according to claim 1 or 2, wherein a vector or free nucleic acids are used in the transformation of step (i).
4. (Currently amended) The method according to claim 3, wherein the vector employed in the transformation (i) is integrated into the genome of at least one of the cells.
5. (Currently amended) The method according to claim 4, wherein the vector employed in the transformation (i) comprises a promoter and/or a terminator.
6. (Currently amended) The method according to any of the preceding claims 3 to 5 claim 3, wherein a vector comprising the a gpd, pcarB, pcarRA and/or ptef1 promoter and/or the a trpC terminator is employed in the transformation-(i).
7. (Currently amended) The method according to any of the preceding claims 3 to 6 claim 3, wherein a vector comprising a resistance gene is employed in the transformation-(i).
8. (Currently amended) The method according to claim 7, wherein the vector employed in the transformation (i) comprises a hygromycin resistance gene (hph), in particular from E. coli.

9. (Currently amended) The method according to ~~any of the preceding claims 5—8~~ claim 6, wherein the gpd promoter ~~has~~ comprises the sequence SEQ ID NO: 1.

10. (Currently amended) The method according to ~~any of the preceding claims 5—8~~ claim 6, wherein the trpC terminator ~~has~~ comprises the sequence SEQ ID NO: 2.

11. (Currently amended) The method according to ~~any of the preceding claims 5—8~~ claim 6, wherein the ~~tef1 ptef1~~ promoter ~~has~~ comprises the sequence SEQ ID NO: 35.

12. (Currently amended) The method according to ~~any of claims 6 to 11~~ claim 6, wherein the gpd promoter and the trpC terminator are derived from *Aspergillus nidulans*.

13. (Currently amended) The method according to ~~any of claims 3 to 12~~ claim 3, wherein the vector comprises the sequence SEQ ID NO: 3.

14. (Currently amended) The method according to ~~any of the preceding claims~~ claim 1, wherein the transformation (i) is carried out using agrobacteria, conjugation, chemicals, electroporation, bombardment with DNA-loaded particles, protoplasts or microinjection.

15. (Currently amended) The method according to ~~any of the preceding claims~~ claim 1, wherein a mutagenic agent is employed in the homokaryotic conversion of step (ii).

16. (Original) The method according to claim 15, wherein the mutagenic agent employed is N-methyl-N'-nitronitrosoguanidine (MNNG), UV radiation or X rays.

17. (Currently amended) The method according to ~~any of the preceding claims~~ claim 1, wherein the selection is carried out by labeling and/or selecting the mononuclear cells.

18. (Currently amended) The method according to ~~any of the preceding claims 1—17~~ claim 1, wherein 5-carbon-5-deazariboflavin (darf) and hygromycin (hyg) or 5-fluororotate (FOA) and uracil and hygromycin are employed in the selection.

19. (Currently amended) The method according to ~~any of claims 3 to 18~~ claim 3, wherein the vector employed in the transformation (i) includes genetic information for producing carotenoids or their precursors.

20. (Currently amended) The method according to ~~any of claims 3 to 19~~ claim 3, wherein the vector employed in the transformation (i) includes genetic information for producing carotenes or xanthophylls.

21. (Currently amended) The method according to ~~any of claims 3 to 20~~ claim 3, wherein the vector employed in the transformation (i) includes genetic information for producing astaxanthin, zeaxanthin, echinenone, β -cryptoxanthin, andonixanthin, adonirubin, canthaxanthin, 3-hydroxyechinenone, 3'-hydroxyechinenone, lycopene, β -carotene, α -carotene, lutein, bixin, phytofluene or phytoene.

22. (Currently amended) The method according to ~~any of claims 3 to 21~~ claim 3, wherein the vector employed in the transformation (i) is designed so as to introduce the genetic information comprised therein into the *Blakeslea trispora* genome.

23. (Currently amended) The method according to ~~any of claims 3 to 22~~ claim 3, wherein the vector employed in the transformation (i) comprises genetic information displaying a ketolase activity and/or a hydroxylase activity after expression.

24. (Currently amended) The method according to claim 23, wherein the vector employed in the transformation (i) comprises SEQ ID NO: 70 or SEQ ID NO: 71 or SEQ ID NO: 76 and/or SEQ ID NO: 72.

25. (Currently amended) The method according to claim 23 ~~or 24~~, wherein the vector employed in the transformation (i) has a sequence selected from the group consisting of SEQ ID NO: NOs: 37-51.

26. (Currently amended) The method according to ~~any of claims 3 to 21~~ claim 3, wherein the vector employed in the transformation (i) is designed so as ~~for that~~ the genetic information comprised therein ~~to be~~ is switched off in the cell.

27. (Currently amended) The method according to ~~any of claims 3 to 21 or 25~~ claim 3, wherein the transformation results in the switching off of a phytoene desaturase gene ~~is switched off due to the transformation (i)~~.

28. (Currently amended) The method according to claim 27, wherein the vector employed in the transformation (i) comprises SEQ ID NO: 69.

29. (Currently amended) The method according to claim 27 or 28, wherein the vector employed in the transformation (i) has comprises the sequence SEQ ID NO: 62.

30. (Currently amended) The method according to any of claims 3 to 21 claim 3, wherein the transformation results in the switching off of a lycopene cyclase gene is switched off due to the transformation.

31. (Currently amended) A genetically modified multinuclear cell of the fungi of the *Blakeslea* genus, in particular *Blakeslea trispora*, obtainable by any of the preceding claims obtained by the method of claim 1.

32. (Currently amended) The use of A method for producing carotenoids or their precursors comprising culturing the cells according to of claim 30 31 or of a mycelium formed therefrom for producing carotenoids or their precursors.

33. (Currently amended) The use according to claim 30 or 31 A method for producing carotenes or xanthophylls comprising culturing the cells of claim 31 or a mycelium formed therefrom.

34. (Currently amended) The use according to any of claims 30 to 32 A method for producing astaxanthin, zeaxanthin, echinenone, β -cryptoxanthin, andonixanthin, adonirubin, canthaxanthin, 3-hydroxyechinenone, 3'-hydroxyechinenone, lycopene, β -carotene, α -carotene, lutein, bixin, phytofluene or phytoene comprising culturing the cells of claim 31 or a mycelium formed therefrom.

35. (Currently amended) A promoter having the sequence comprising SEQ ID NO: 1 or SEQ ID NO: 35 for the use in the method according to any of claims 1—29 claim 1.

36. (Currently amended) A terminator having the sequence comprising SEQ ID NO: 2 for the use in the method according to any of claims 1—29 claim 1.

37. (Currently amended) A vector comprising SEQ ID NO: 3 for the use in the method according to ~~any of claims 1-29~~ claim 1.

38. (Currently amended) The vector according to claim ~~36~~ 37 ~~for the use in the method according to any of claims 1-29~~, comprising SEQ ID NO: 69 and/or SEQ ID NO: 70 or SEQ ID NO: 71 and/or SEQ ID NO: 72 or SEQ ID NO: 76.

39. (New) The method according to claim 8, wherein the hygromycin resistance gene (hph) is from *E. coli*.

40. (New) A genetically modified multinuclear cell of the fungi *Blakeslea trispora* obtained by the method of claim 1.